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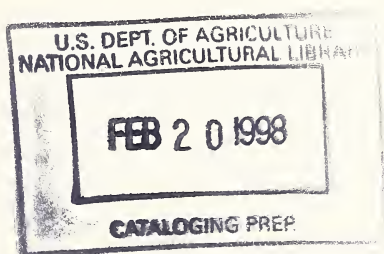
Animal and
Plant Health
Inspection
Service

Veterinary Services: Protecting America's Animal Health

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Preface

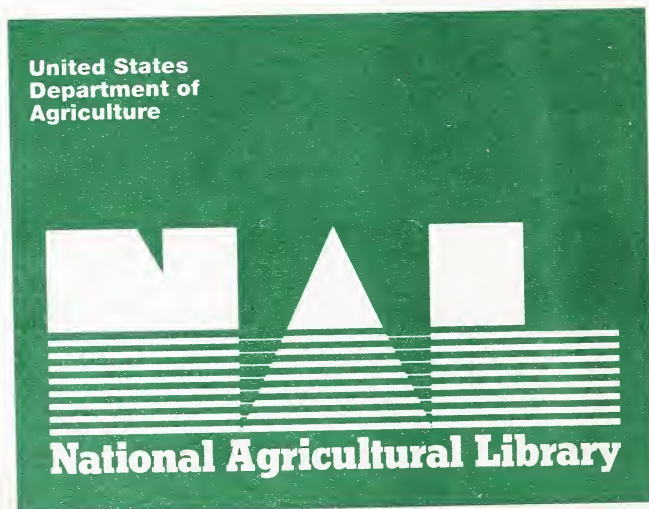
One of the agencies in the U.S. Department Agriculture is APHIS—the Animal and Plant Health Inspection Service. Within APHIS are two program units: Veterinary Services, and Plant Protection and Quarantine.

Veterinary Services is made up of a team of veterinarians, other professionals, animal health technicians, and support personnel. It has six primary tasks: Keeping foreign animal diseases out of the country, eradicating outbreaks that get past our border defenses, eradicating domestic diseases of economic and/or human health significance, preventing the interstate spread of animal diseases, assuring safe and potent veterinary biologics, and assuring the humane care of animals.

Disease control and eradication programs are carried out through close cooperation with State governments, the veterinary profession, and the livestock and poultry industries.

Livestock and poultry are continually threatened by diseases whose effect ranges from slight debilitation and economic loss to decimation of flocks and herds. A number of these diseases also affect man.

The best economic approach to livestock and poultry diseases is to eradicate them wherever feasible. Preventing the introduction of foreign animal diseases and eradicating those domestic diseases that are of major economic significance eliminates the need for continuous control programs and the annual costs associated with them.



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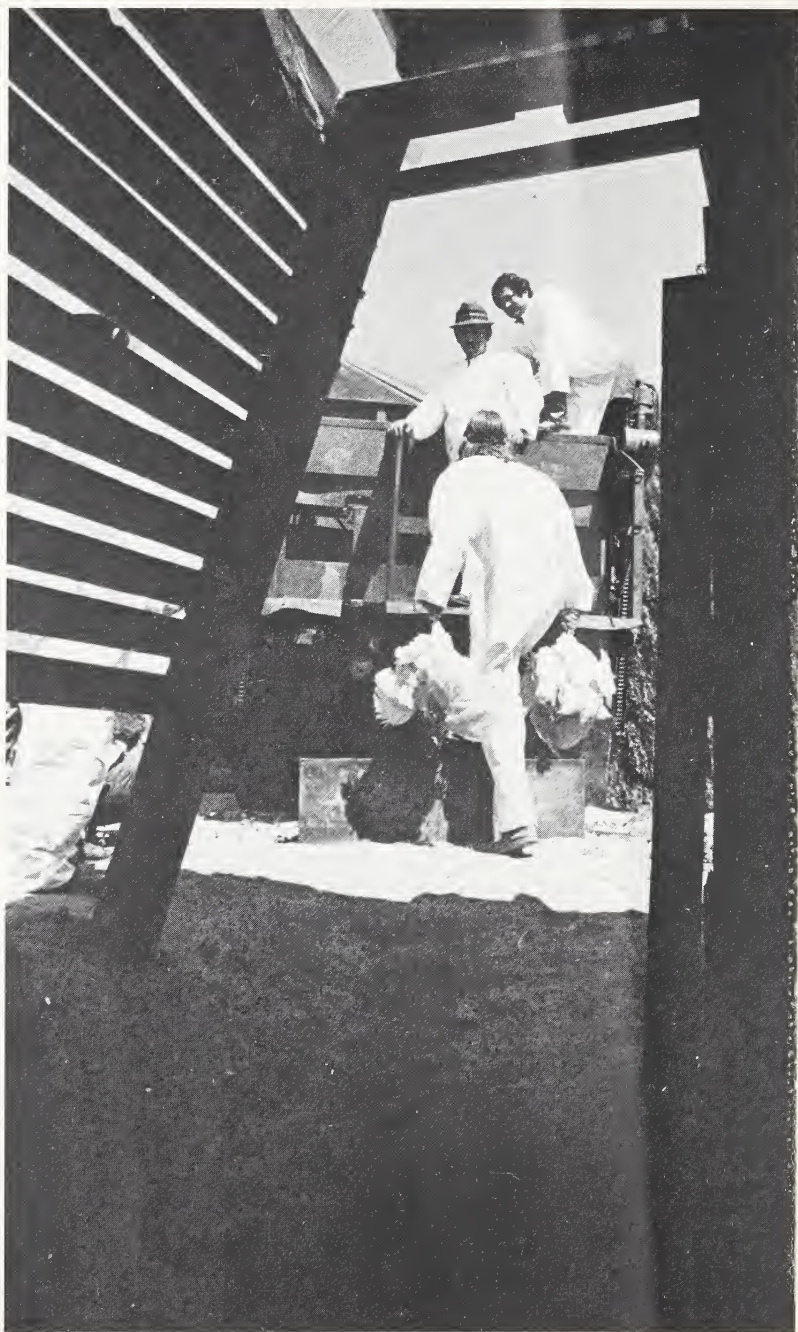
A key to a plentiful supply of animal protein can be summed up in one phrase—healthy livestock. And this is no accident, for America's animal health is the result of a team effort. Good husbandry by farmers and ranchers combined with excellent professional care by practicing veterinarians and an organized effort to control and eradicate animal diseases through regulatory veterinary medicine have led to one of the healthiest and most productive livestock populations in the world.



Although America was fortunate in the beginning—free of many of the devastating diseases that plagued the “old world”—by the 1880's the disease situation was critical. Hog cholera, contagious bovine pleuropneumonia, and Texas cattle fever were taking a heavy toll; and U.S. meats and animals were being rejected in foreign markets.



USDA's Bureau of Animal Industry—the predecessor of Veterinary Services—was established in 1884 to suppress contagious bovine pleuropneumonia, a foreign disease that was threatening a burgeoning export market. In 8 years, scientists had wiped out the disease, even before the causative agent was known.



The best economic approach to livestock and poultry diseases is to eradicate them wherever feasible. This eliminates the need for continuous control programs and the on-going costs associated with them.



Five regional emergency animal disease eradication organizations (READEOs) have been set up within Veterinary Services to handle any foreign disease that might gain entry into this country. Within 24 hours of diagnosis, task forces are on the scene of an outbreak.



Cooperation between the States, the Federal Government and the affected industry is the keystone of successful animal disease eradication programs. The decision to begin a nationwide campaign against a domestic animal disease is based on several factors: What are the public health and economic significances of the disease? Can it be controlled by individual farmers without an area approach? Do scientists know enough about the disease? And most importantly, are producers and the livestock industry willing to cooperate in the campaign?



Fighting diseases depends on a good diagnostic capability. The National Veterinary Services Laboratories at Ames, Iowa, receive reference samples from State and local laboratories throughout the country.



Hog cholera is the most recent animal disease to be eradicated, with the United States declared "hog cholera free" in January 1978 after a 15-year eradication campaign. The time-tested procedures of quarantine, slaughter, and disinfection were the basis of a cooperative program between the States, the Federal Government, and a supportive swine industry.



Getting rid of brucellosis is the number one domestic priority of Veterinary Services. Elimination of this costly cattle disease will cut farmer's production costs... and ultimately increase meat supplies for consumers.



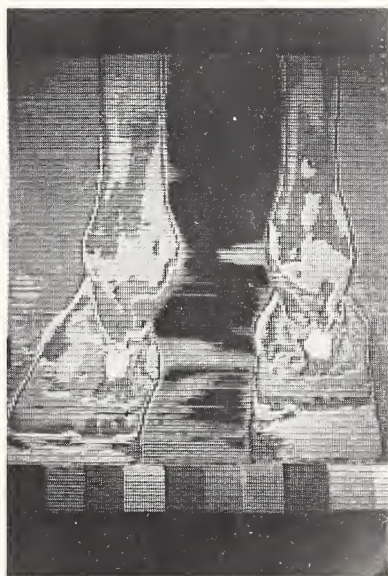
Animals to be exported are checked to make sure they meet the health requirements of the receiving country. Exporting healthy animals helps the U.S. balance of payments.



Import regulations developed following the last outbreak of foot-and-mouth disease in 1929 have played an important part in keeping our country free of that and many other foreign animal diseases.



Seeing to the welfare of animals used in research, in circuses, zoos, and in the wholesale pet trade is a big challenge for Veterinary Services.



Thermovision is one of the tools used to detect soring in Tennessee walking horses. Soring is the use of cruel practices to accentuate the gait of show horses, a practice outlawed by the Horse Protection Act.



Animal vaccines and other veterinary biologics play an important role in animal health . . . and Veterinary Services works to make sure these products are safe, pure, potent, and effective.

Introduction

Why are the farmers and ranchers of the United States able to produce so much beef... lamb... pork... and poultry for the tables of America's consumers?

Of course there's no simple answer. But one key to this plentiful supply of animal protein can be summed up in a single phrase—"healthy livestock."

And this is no accident. America's animal health is the result of a team effort—good husbandry by farmers and ranchers, excellent professional care by practicing veterinarians, and an organized effort to control and eradicate animal disease.

Background

America was fortunate in the beginning. For this was the "new land"—free of the many devastating animal diseases that plagued Europe, Asia, and Africa. But the arrival of a cow in the port of New York in 1843 marked the start of drastic change in that situation. For that cow brought with her contagious bovine pleuropneumonia—a disease that for centuries had killed millions of cattle in Europe and Asia.

By the 1880's, the situation was critical. Contagious bovine pleuropneumonia, hog cholera, Texas cattle fever, and other diseases were taking a heavy toll of cattle and swine. Foot-and-mouth disease had already made a brief appearance. American meats and animals were being rejected in foreign markets.

In 1884, Congress created the Bureau of Animal Industry (BAI) within USDA to "prevent the exportation of diseased cattle, and to provide means for the suppression and extirpation of pleuropneumonia and other contagious diseases among domestic animals." Within 8 years, BAI scientists had wiped out contagious bovine pleuropneumonia and were well on their way to finding the key to the eradication of Texas cattle fever.

Other successes followed. Between 1870 and 1929, nine outbreaks of foot-and-mouth disease were wiped out—in all but two cases within a few months. Import rules developed after the last outbreak have played a major part in protecting the United States from this dread disease since then.

Fowl plague was eradicated in 1929. Glanders and dourine, two horse diseases, were eliminated in 1934 and 1942, respectively. The successful conclusion of a 37-year battle against cattle fever ticks and the disease they carry came in 1943.

The policy of animal disease eradication—rather than control—became firmly established in the early years of the BAI. The basic procedures of quarantine, slaughter, and disinfection proved again and again that animal diseases could be eradicated. The principle of cooperation with the States in disease eradication programs also became established in these early years.

In 1953, the BAI was abolished and its functions were transferred to USDA's Agricultural Research Service and later—in 1971—to Veterinary Services in the Animal and Plant Health Inspection Service (APHIS).

But the proud traditions of the BAI continued. Vesticular exanthema (VE) of swine was eradicated in 1959. That same year, screwworms were eradicated in the southeastern United States, and later overwintering populations of this pest were eradicated in the Southwest. Now, a cooperative eradication program is underway in Mexico to prevent annual reinfestations.

More recently, in 1971, Veterinary Services stopped an invasion of Venezuelan equine encephalitis (VEE)—a form of horse sleeping sickness—in Texas. Later that year, a massive outbreak of exotic Newcastle disease struck poultry in southern California. It took a year and a half and the death or destruction of nearly 12 million birds—mostly laying hens—before the disease was wiped out (at a cost of \$56 million).

January 1973 marked the official end of a "300-year itch"—the eradication of sheep scabies.

In January 1978, the Secretary of Agriculture officially declared the United States "hog cholera free"—perhaps the most significant accomplishment in more than 95 years of fighting animal diseases.

Diseases Eradicated from the United States

<i>Year</i>	<i>Disease</i>
1892	Contagious bovine pleuropneumonia
1929	Foot-and-mouth disease
1929	Fowl plague
1934	Glanders
1942	Dourine
1943	Cattle fever ticks
1959	Vesicular exanthema (VE)
1959 & 66	Screwworms (southeast & southwest)
1971	Venezuelan equine encephalitis (VEE)
1973	Sheep scabies
1974	Exotic Newcastle disease
1978	Hog cholera

Functions

Today, Veterinary Services (VS) in APHIS has six basic areas of responsibility: (1) keeping foreign diseases out of the country and certifying the health of export animals; (2) eradicating outbreaks of foreign animal diseases that get past our border defenses; (3) fighting domestic animal diseases; (4) preventing the interstate spread of diseases; (5) keeping veterinary biologics safe, pure, potent, and effective; and (6) providing for humane care of animals.

VS import regulations are strictly enforced to prevent the possible introduction of foreign animal diseases. Animals and poultry may be brought into the United States only after comprehensive inspection and quarantine procedures. Animals to be exported are checked to be sure they meet the health requirements of the receiving country.

In an era of rapid air and land travel, the U.S. livestock population is faced with an ever-increasing threat from exotic diseases. Special teams of trained veterinarians, animal health technicians, and other experts have been set up within VS to respond immediately to an outbreak of a foreign animal disease.

The decision to begin a nationwide campaign against a domestic animal disease is based on several factors. What is the public health significance and economic importance of the disease? Can it be controlled by individual farmers without an area approach? Do scientists know enough about the disease? And most importantly, are producers and the livestock industry willing to cooperate in the campaign? VS coordinates animal disease eradication programs with the various States that are involved.

VS has a basic responsibility to issue and enforce regulations aimed at stopping the interstate spread of animal diseases.

Under the Virus-Serum-Toxin Act of 1913, VS regulates the production and marketing of veterinary biologics to make sure that vaccines, antitoxins, and similar products shipped across State lines are safe, pure, potent, and effective.

VS also enforces humane laws, including the handling of livestock shipped by rail; the care and treatment of animals used in research, the wholesale pet trade, zoos, and circuses; and the prohibiting of "soring"—the use of cruel and inhumane practices to exaggerate the gait of show horses.

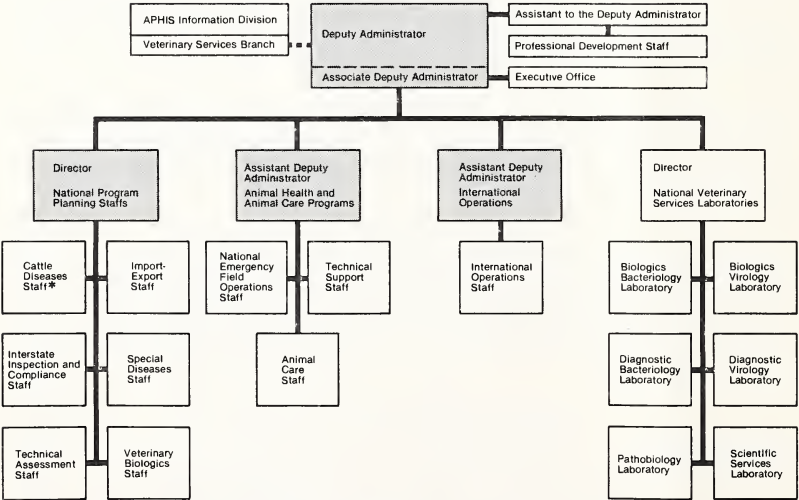
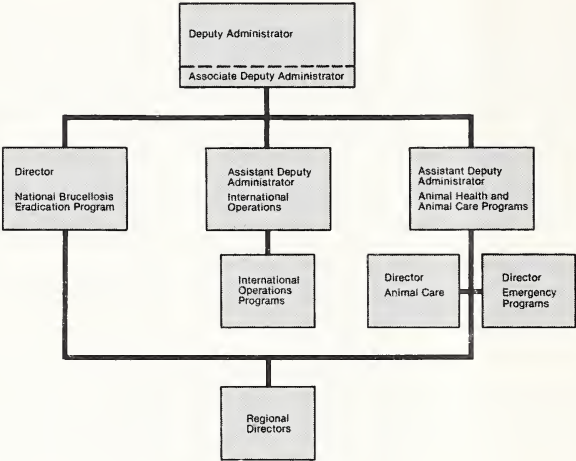
Organization

The VS deputy administrator, headquartered in Washington, D.C., participates with the APHIS administrator and other USDA officials in developing and carrying out programs under the six areas listed above.

The deputy administrator and his associate direct all VS activities, which are carried out by about 2,400 permanent employees including about 640 veterinarians.

Veterinary Services Organization

- Line Responsibilities
- Staff and Laboratory Functions



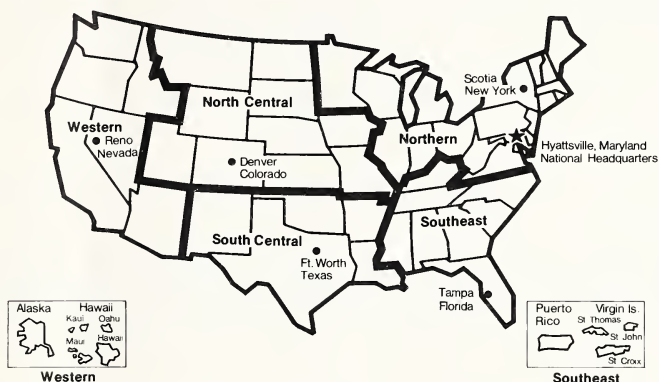
*Also provides staff support to Director, National Brucellosis Eradication Program

Line Responsibilities

Line officials reporting to the deputy administrator are two assistants and the director of the *national brucellosis eradication program*. One assistant, in charge of *international operations*, is responsible for (1) cooperative surveillance programs for foot-and-mouth diseases with Mexico, Central America, Panama, and South America; (2) the U.S.-Mexico screwworm eradication program; and (3) a disease intelligence service for Europe, the Middle East, and Africa. The other assistant deputy administrator is responsible for domestic *animal health and animal care programs*.

United States Department of Agriculture
Animal and Plant Health Inspection Service

Veterinary Services Regions



Field Activities

Five regional directors (who report to the assistant deputy administrator responsible for animal health and animal care programs) are responsible for planning, directing and coordinating activities in their assigned groups of States. They are headquartered at Scotia, N.Y., Tampa, Fla., Ft. Worth, Tex., Denver, Colo., and Reno, Nev.

Reporting to each regional director are area veterinarians in charge (AVIC's), along with regional epidemiologists, compliance officers, biologics specialists, and animal care specialists. Each AVIC is responsible for VS field activities in one State (exceptions are the AVIC in New England, who directs activities in Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut; the AVIC in Washington, who handles both Washington and Alaska; the AVIC in Maryland, who handles Maryland, Delaware, and the District of Columbia; and the AVIC in Puerto Rico who also handles the U.S. Virgin Islands). Reporting to each AVIC are administrative support personnel

and compliance officers along with the veterinary medical officers (VMO's) and animal health technicians (AHT's) who carry out the field work.

Staff and Laboratory Support

The VS staffs at Hyattsville, Md., develop, evaluate, and provide leadership for on-going VS programs. Staffs formulate standards, regulations, and model laws; develop methods and procedures; develop budgets; and provide scientific and technical support for funded VS programs. They are also required to keep up to date on diseases in their program areas.

The following staffs report to the director, national program planning staffs:

The *cattle diseases* staff provides support for cattle tuberculosis and maintains an interest in and knowledge of anaplasmosis, anthrax, bovine leukosis, cysticercosis, mastitis, and other diseases of cattle. The brucellosis section of this staff provides support for both cattle and swine brucellosis for the director of the national brucellosis eradication program.

The *import-export* staff develops policy to prevent the entry of diseased animals, birds, or animal products and policy to prevent the export of unhealthy livestock and poultry. The staff issues import and movement permits for animals and birds and import and movement permits for organisms and vectors. Certificates of pure breeding are also checked by the staff to see if they qualify for duty-free entry as purebred livestock if they are of a breed listed in the Code of Federal Regulations.

The *interstate inspection and compliance* staff handles animal identification programs and processes enforcement activities under animal care, animal quarantine, and veterinary biologics regulations. The staff also processes veterinary accreditation violations. Market standards and approvals are coordinated by this staff. This staff also processes cooperative agreements with persons or other agencies (usually States) with which VS does business.

The *special diseases* staff has active programs for cattle fever ticks, cattle scabies, and scrapie. Nonfunded diseases that are monitored include bluetongue, Venezuelan equine encephalitis (VEE), contagious equine metritis (CEM), equine infectious anemia (EIA) and equine piroplasmiasis (EP). In addition, the staff develops technical data on dipping and spraying facilities and techniques and evaluates and recommends pesticides for listing as USDA-permitted pesticides.

The special diseases staff also handles psuedorabies and the Swine Health Protection Act, a law enacted in 1980 to regulate the feeding of garbage to swine. The staff also handles swine disease surveillance activities. On the poultry side, the staff administers the National Poultry

Improvement Plan, a voluntary State-Federal-industry cooperative program to eliminate pullorum disease, fowl typhoid, *Mycoplasma gallisepticum* (MG), and *M. synoviae* (MS) from commercial poultry flocks. The staff also handles surveillance for exotic Newcastle disease as well as the monitoring of ornithosis and salmonellosis.

The *technical assessment* staff studies current VS programs to see that the technical abilities and methods used are still effective in carrying out the mission. The staff also looks at the potential of new techniques and diagnostic tools as they relate to regulatory veterinary medicine.

The *veterinary biologics* staff develops regulations to implement the Virus-Serum-Toxin Act of 1913, which requires that vaccines, bacterins, antitoxins and similar veterinary biologics be safe, pure, potent and effective before they are shipped across state lines.

Three staffs report to the assistant deputy administrator responsible for animal health and care programs. They are:

Staffs for emergency programs develop methods to control and eradicate outbreaks of foreign animal diseases and provide the technical knowledge and capability to combat them should they enter this country. There are two staffs—*national emergency field operations* and *technical support*.

The *animal care* staff handles support activities for the animal welfare and horse protection programs, and keeps abreast of current issues such as farm animal welfare and the "animal rights" movement.

Under the assistant deputy administrator for international operations is one staff:

The *international operations* staff maintains an awareness of the occurrence and incidence of foreign animal diseases throughout the world. It also provides staff support for the U.S.-Mexico screwworm eradication effort and for disease surveillance activities carried out in foreign countries.

The following functions provide direct service to the VS deputy administrator:

Laboratory support for the veterinary biologics program, import-export testing and the various disease control and eradication programs is provided by the National Veterinary Services Laboratories (NVSL) at Ames, Iowa. NVSL also serves as a reference assistance laboratory.

There are six separate laboratories at NVSL. They are (1) biologics bacteriology, (2) biologics virology, (3) diagnostic bacteriology, (4) diagnostics virology, (5) pathobiology, and (6) scientific services.

The *professional development* staff plans and carries out training programs and maintains liaison with veterinary institutions. In addition, the staff provides training for foreign visitors and administers the veterinary accreditation program.

Information support for all VS activities and programs is provided through the veterinary services programs branch of the APHIS Information Division.

Domestic Program Activities of Veterinary Services



Animal Welfare

Animal welfare legislation, when first enacted in 1966, regulated trade in dogs and cats used for laboratory research and was aimed at stopping "petknapping." Amendments in 1970 and 1976 greatly broadened the scope of the Animal Welfare Act.

Industries subject to the act, in addition to research facilities, include zoos, circuses, roadside parks exhibiting animals, wholesale dog breeders and brokers, retail pet stores selling exotic animals, and common carriers and intermediate handlers transporting live animals.

Not included under the act are farm animals and all cold-blooded animals, such as reptiles and fish. In addition, laboratory rats and mice are exempt under regulation.

APHIS has established minimum standards for the care and treatment of animals covered by the act. Five standards deal with adequate facilities: housing, protection from bad weather, separation of incompatible animals, sanitation, and ventilation. The remaining five cover other aspects of humane treatment: feeding, watering, veterinary care, handling, and transportation.

APHIS enforces the act through a system of licensing and registration and by inspecting those covered by the act to make sure they are in compliance with the standards. Violators are prosecuted through administrative and criminal proceedings.

Brucellosis

Brucellosis is a contagious bacterial disease of animals transmissible to man. The disease is also called contagious abortion or Bang's disease in livestock. In man, it is known as undulant fever or Malta fever.

Three types of bacteria cause brucellosis, with *Brucella abortus* usually causing the disease in cattle, *Br. suis* in swine, and *Br. melitensis* in goats.

Brucellosis in cattle is characterized by abortion, infertility, and lower milk yields. The disease in swine shows most of the signs seen in infected cattle, plus arthritis and abscesses. In goats, abortion and lowered milk production are the main disease signs. Humans get brucellosis by direct contact with infected animals or by consuming unpasteurized milk or dairy products. Human brucellosis usually develops like the "flu," but persists for several weeks or more. Initial symptoms are "tiring easily" and headaches, followed by high fever, chills, drenching sweats, joint pains, backache, and loss of weight and appetite. The fever may subside only to recur again and again; hence the term "undulant fever" to describe human brucellosis. The 159 human cases reported in 1981 are a mere fraction of the 6,321 reported in 1947.

The incubation period—the time between exposure to an infectious dose of organisms and the first appearance of disease signs—is quite variable in cattle, ranging from about 2 weeks to 8 months or longer. Usually, cattle develop a positive reaction to the blood test within 3 to 12 weeks after infection, although some may not do this for several months. When it enters a cattle herd, brucellosis can cause serious losses due to abortion "storms," infertility, and lowered milk production. Infected herds can have 40 percent fewer calves than normal. Milk production can be reduced about 20 percent.

During the 1920's the first efforts to control brucellosis in the United States were initiated as independent State programs. Little progress was made until a nationwide test and slaughter program was launched in 1934 as part of an emergency cattle reduction effort in the drought years of the 1930's. Calfhood vaccination with Strain 19 was added to the program in 1940. The infection rate decreased from about 11.5 percent of the cattle tested to 2.4 percent by 1941, but rose to 5 percent by 1946 because of decreased efforts against disease during the war years.

An accelerated program to eradicate the disease began in 1954. Stepped-up measures included area testing and use of two surveillance programs: (1) the brucellosis ring test to provide for continuous and inexpensive screening of dairy herds, and (2) the market cattle testing

program to monitor the disease in beef herds. Calfhood vaccination continued.

The program was provided with new direction and impetus as a result of a special 2-year study completed in 1978. In 1980, a reduced dosage of Strain 19 brucellosis vaccine was made available to allow vaccination of older calves and to ensure less chance of causing testing problems. A new State rating system, based on the amount of infection, went into effect in May 1982, replacing a county-by-county system used previously. A "free" rating means no infection within a State for at least a year. Other States are classified as class "A" (no more than 0.25 percent herd infection), "B" (0.25 to 1.5 percent), or "C" (herd infection greater than 1.5 percent).

The swine brucellosis eradication program, operating concurrently with the cattle program, depends primarily on slaughter surveillance to locate infected herds, which are then freed of the disease through test and slaughter, or on depopulation and restocking. States are classified in three "stages," with stage III States declared free of the disease.

In the United States, incidence of brucellosis in cattle had been reduced to about 0.4 percent by 1982, with most infection concentrated in 10 southeastern and south-central States. Incidence in swine is even lower, with less than 0.1 percent of animals tested found to be infected. The disease has not been found in goats for over 10 years.

Cattle Fever Ticks

Cattle fever ticks spread bovine piroplasmiasis, a severe and often fatal disease of cattle. Caused by a blood parasite that destroys red blood cells, the disease is also called cattle tick fever or Texas fever.

For almost 150 years, much of the southern and southwestern United States was infested with cattle fever ticks (*Boophilus annulatus* and *Boophilus microplus*). Cattle tick fever caused great losses to cattlemen each year. In 1906, when a nationwide eradication program began, the disease was taking a \$40 million annual toll. Today, that loss would be estimated at more than \$1 billion a year.

Cattle fever ticks were eradicated from the United States in 1943 after a 37-year campaign consisting of systematically dipping all cattle. Today's program consists of maintaining a permanent quarantine zone, which extends about 500 miles along the Rio Grande from the Amistad Dam near Del Rio, Tex., to the Gulf of Mexico. Biweekly inspection of livestock within this buffer zone serves as a barrier against strays from Mexico that might be carrying ticks.

All cattle and horses leaving the quarantine zone must be inspected and given a precautionary dipping. Infestations found are eradicated by systematic dipping of cattle and horses on the infested premises for a period of 5 to 9 months. Occasionally, infestations are found outside the

quarantine zone. This is usually due to strays, smuggled animals, or movement of infested animals. The same procedure of systematic dipping is followed.

Cattle Scabies

Psoroptic cattle scabies is caused by tiny parasitic mites that puncture the skin of cattle and feed on the body fluids released from the wounds. These fluids dry and form scabs. As mites increase in number, an infested animal's hair will fall out and the lesions that are formed can eventually cover much of the body with thick, crusty scabs—hence the name, scabies.

Scabies does not effect the wholesomeness of meat from infested cattle, but the intense itching caused by the mites produces loss of appetite and lowered gains and feed efficiency. Economic losses, particularly in feedlots, can be severe.

A program to combat cattle scabies is carried out by VS in cooperation with the States. The program involves State quarantines of infested lots or herds until they are treated with pesticides to kill the scabies mites. Each outbreak is investigated to determine the origin of the infestation and any possible spread. VS also maintains a parasite laboratory for positive identification of each reported case. A chemical laboratory tests dip samples to help insure that proper pesticide concentrations are used when cattle are dipped.

Emergency Programs

An emergency programs section was established within VS in 1972 to increase the agency's capability to control and eradicate outbreaks of foreign animal diseases that pose a serious threat to U.S. livestock and poultry.

VS maintains an awareness of animal diseases in the world by monitoring the worldwide animal disease situation. It also has established a highly sophisticated information retrieval system so that VS will be better equipped to deal with any outbreak of an exotic disease. This system includes: (1) a search of the world's literature in the fields of interest; (2) reading, indexing, and coding relevant articles; and (3) transferring these articles to a microfilm data bank for storage and retrieval. In response to program needs or user requests, stored information—including maps—at the Emergency Programs Information Center (EPIC) in Hyattsville, Md., can be rapidly retrieved and disseminated.

VS has a list of some 40 exotic diseases with which it is prepared to deal. Seventeen of these are in the "priority one" category—those considered most dangerous to the nation's livestock and poultry. This list includes African horse sickness, African swine fever, bluetongue (foreign strains), bovine babesiosis, East Coast fever, exotic Newcastle disease,

foot-and-mouth disease, fowl plague, heartwater, hog cholera, lumpy skin disease, Rift Valley fever, rinderpest, San Miguel sea lion virus, swine vesicular disease, Venezuelan equine encephalitis, and vesicular exanthema.

VS has set up an intensive animal disease surveillance system aimed at rapidly detecting and diagnosing any exotic disease outbreak in this country. Specially trained foreign animal disease diagnosticians are stationed throughout the United States so they can immediately investigate each suspected foreign animal disease and submit specimens to the appropriate laboratory for diagnosis.

To carry out field operations when a foreign disease is diagnosed, a Regional Emergency Animal Disease Eradication Organization (READEO) has been set up in each of the five VS regions. The READEOs were established on the theory that a preselected, pretrained unit of specialists can eradicate a disease more rapidly and efficiently than a group pulled together at the time an outbreak occurs.

Federal, State, university, military and other sources have been tapped to fill key position in the READEOs. These people are trained in their specific responsibilities and are prepared to respond quickly when an outbreak occurs. When a READEO is activated, a task force is set up under the direction of the assistant VS regional director, who is relieved of his regular duties. The State veterinarian(s) of the affected State(s) usually serves as co-director(s) of the task force.

A special computerized reporting and information retrieval system—the “recorded emergency animal disease information” or “READI” system—has been established to speed analysis of data gathered in a disease outbreak. Under this system, all field disease reports are fed into a central computer, which then can give out the information by State or region, type of outbreak, species of animals affected, and so on.

Training programs and test exercise are held periodically to make sure that each member of the READEOs knows his or her job.

Export

To assure that the United States exports only healthy poultry and livestock—and thus maintains its good reputation—VS requires animals to be examined and certified free of communicable diseases before they are shipped to foreign nations. Examinations and tests—usually done by accredited veterinarians—cover both the U.S. export health requirements and the frequently complex import requirements of the receiving nation. A VS veterinarian endorses export health certificates after all tests and other requirements have been met. Then a final examination is conducted by a VS veterinarian at the port of export before the livestock or poultry leave the country.

Horse Protection

The Horse Protection Act, passed in 1970 and amended in 1976, is aimed at stopping the practice of soring horses. Soring is the use of cruel methods, devices, or irritants to cause pain in a horse's legs. It is done to accentuate a horse's gait in the show ring and thus gain unfair advantage over horses that are not sore. Because the Tennessee Walking Horse industry commonly used this practice to accentuate show ring gaits, VS regulatory activities have centered upon those shows and sales.

A sore horse changes its gait by placing its hind feet further forward to relieve the pain in the front feet and by raising the front feet quickly whenever they strike the ground. The resulting high-stepping, far-reaching motion is known in horse circles as the "big lick."

VS has initiated rules giving the walking horse industry the opportunity for self regulation through the use of "designated qualified persons" (DQPs). Once trained and licensed, these DQPs can be used by horse show management to exclude sore horses from the show ring and thus relieve management of its liability under the act. Shows and DQPs continue to be monitored by VS personnel, however, through inspections and the use of thermovision. The latter technique scans a horse's legs with infrared sensors that detect temperature changes. Since inflammation caused by soring results in a heat rise in the sore area, the "heat image" from thermovision produces useful information that can be photographed and used as evidence of soring.

Violators of the act are prosecuted in Federal courts or through USDA administrative procedures.

Identification

Identification is a key part of most animal disease control and eradication programs. A number of animal identification devices and methods—including plastic and metal eartags, hot iron and freeze brands, backtags, and tattoos—are used to identify livestock in trade channels so that they can be traced to their farm or ranch of origin.

Uniform coded eartags and backtags are supplied by VS officials and constitute the principal identification devices used in a national market cattle identification (MCI) program. A similar market swine identification (MSI) program uses eartags, backtags, and tattoos. These identification systems make it possible to conduct extensive screening programs at livestock concentration points and slaughter plants to locate foci of infection in the brucellosis and tuberculosis eradication programs and to determine other disease incidence rates.

Import

Strict regulations on the import of animals and products that could spread disease is the first line of defense against foreign animal disease. VS continually reviews and evaluates research work concerning processing of animal products and associated materials, new tests for diseases, procedures for precautionary treatment of animals and birds, and studies relating to disease trends in foreign countries. On the basis of this information, appropriate changes are made in import regulations, procedures used at ports of entry, and guidelines for the inspection and approval of destination establishments or processing procedures.

VS issues prior import permits to prospective importers. Control also is maintained over the importation and domestic movement of infectious organisms and their vectors to make sure that such movements do not constitute a threat to the livestock industry. Many laboratories in the United States conduct research on the cause and spread of animal diseases, and scientists often want to import organisms and vectors from foreign countries or obtain them from other U.S. laboratories. All such imports—and many of the interstate movements—must be accompanied by a VS permit.

Permits for the importation of animals through VS animal import centers are issued by the import-export staff. Permits for importing birds through USDA-approved, privately owned bird quarantine stations are issued by the particular VS field office supervising the station through which the birds will be brought.

VS operates three animal import centers: two smaller ones at Miami, Fla., and Honolulu, Hawaii, and a larger center at Newburgh, N.Y. The New York Animal Import Center permits the annual importation of up to 800 horses, 300 zoo animals, 1,800 cattle, and 4,000 poultry.

Commercial shipments of birds are imported through any VS animal import center or through privately owned bird quarantine stations approved to operate under VS supervision. In 1982, there were about 90 such privately owned bird quarantine stations throughout the United States.

An offshore, maximum-security animal import center, the Harry S Truman Animal Import Center (HSTAIC) at Fleming Key, Fla., provides quarantine services for cattle imported directly from countries affected with foot-and-mouth diseases.

Dedicated in 1979, it permits the first such importations since 1930, when ruminants and swine were prohibited entry from any country where foot-and-mouth disease or rinderpest exists. HSTAIC can accommodate 400 cattle for each 3-month quarantine period.

Persons and baggage entering the United States from foreign countries are checked for prohibited agricultural materials—both plant and

animal—at U.S. ports of entry by APHIS Plant Protection and Quarantine (PPQ) personnel. U.S. port of entry inspection of animal products and byproducts is also the responsibility of PPQ.

Certain agricultural materials from foreign countries are permitted entry under restriction. VS has approved over 200 processing plants in the United States to receive and handle a wide variety of restricted animal products, byproducts, and related materials. These establishments are under continuing surveillance to insure that the restricted imports do not constitute a disease risk for livestock populations.

VS monitors overseas inspections and quarantines, certifications, tests, and precautionary treatments of certain animals, animal semen, and birds. VS port veterinarians also carry out port of entry inspection for animals imported through some 43 Canadian and 15 Mexican approved ports of entry.

Interstate Inspection

VS has established standards for sanitation and health inspection for markets and these are administered through a system of specific market approvals. VS enforces Federal regulations governing interstate movement, importation, and exportation of animals by monitoring livestock movements. Over 2,000 livestock concentration points are checked for compliance with market standards and interstate regulations. Violators are prosecuted in U.S. district courts.

National Poultry Improvement Plan

VS administers the National Poultry Improvement Plan (NPIP), a voluntary State-Federal-industry cooperative program designed to control and eliminate certain egg-transmitted and hatchery-disseminated diseases of poultry. NPIP was founded in 1935 and is carried out in 47 participating States. As a result of the NPIP, pullorum and fowl typhoid have been essentially eliminated from the commercial poultry industry and considerable strides have been made toward controlling *Mycoplasma gallisepticum* (MG) and *M. synoviae* (MS) in the poultry meat industry.

Pseudorabies

Pseudorabies, also known as “mad itch” and Aujeszky’s disease, has become a major threat to the swine industry. A highly virulent form of the disease, which first appeared in this country in the 1960’s, can kill up to 100 percent of young pigs in some outbreaks. However, the disease can occur in adult swine with few, if any, visible signs. Thus, hogs serve as a natural reservoir for the disease.

Swine can transmit pseudorabies to cattle, sheep, and other animals, where it causes a fatal encephalitis with severe itching and self-mutilation—hence the name “mad itch.” The disease does not affect man.

Vaccines are available to reduce economic losses, but they will not prevent swine from becoming infected and spreading the disease to other animals. Also, since tests cannot differentiate between vaccinated and infected swine, there is no way to be certain if a vaccinated animal is actually infected or just showing a reaction to the vaccine.

Although incidence has not been measured precisely, indications are that pseudorabies increased drastically during the 1970's.

Pilot eradication projects are currently under consideration to test various methods of combating pseudorabies.

Scrapie

Scrapie is a fatal disease of sheep and goats caused by a filterable, transmissible, self-replicating agent even smaller than a virus. The disease causes a progressive degeneration of the central nervous system. This causes the animal to rub, scratch, and become debilitated and incoordinated. Scrapie has an extremely long incubation period; exposed animals may carry the agent 18 to 42 months or longer before signs of the disease appear.

Scrapie was first diagnosed in the United States in 1947. Since then it has been found in nearly 250 flocks in 39 States.

The cooperative State-Federal scrapie eradication program began in 1952. The program involves finding and diagnosing the disease, quarantining infected flocks, and slaughtering affected and exposed animals. Exposed animals and source flocks are traced. Indemnities are paid for animals that must be slaughtered because of scrapie.

In addition, a field trial is being carried out at Mission, Tex., to study how scrapie spreads. This trial has shown that succeeding generations from scrapie-infected animals will develop the disease and that scrapie will spread to nonrelated sheep and goats held and bred on infected premises.

VS is also concerned about similarities between scrapie and two diseases of man—kuru and Creutzfeldt-Jakob disease. Laboratory experiments have shown that scrapie can be transmitted to at least five species of monkeys. Since 1975, sheep and goats exposed to scrapie have not been permitted to be slaughtered for human consumption.

Swine Health Protection Act

A number of infectious and communicable diseases can be transmitted to swine through the feeding of raw or improperly cooked garbage containing infectious material. Among these are African swine fever, foot-and-mouth disease, hog cholera, trichinosis, tuberculosis, and vesicular exanthema (VE).

The practice of cooking food waste fed to swine to kill disease organisms began on an organized basis in the early 1950's as a result of a widespread outbreak of VE. With the successful conclusion of the VE eradication program in 1959, enforcement of food waste-feeding laws became lax in many States. State laws were not enforced consistently or strengthened until well into the hog cholera eradication program, which began in late 1962.

During and subsequent to the hog cholera eradication program, 16 States passed laws that prohibited the feeding of garbage to swine. Those states are Alabama, Delaware, Georgia, Idaho, Illinois, Iowa, Louisiana, Maryland, Mississippi, Nebraska, New York, South Carolina, South Dakota, Tennessee, Virginia, and Wisconsin.

There are approximately 8,200 premises in the United States on which food waste is known to be fed to hogs. In 1979, there were 1,385 reported violations of food waste-feeding laws.

While untreated garbage is a potential source of a number of serious and costly animal diseases, properly cooked food waste is a valuable feed that hogs can use to provide additional protein for consumers. Feeding food waste to hogs also provides an option to cities, military installations, and others to dispose of a waste product economically.

The common method of rendering garbage safe for consumption by swine is to boil the material for 30 minutes.

In October 1980, Congress passed the Swine Health Protection Act, a Federal law that authorizes VS to establish a uniform system in all States to regulate treatment of garbage fed to swine. States that have laws and regulations meeting the minimum standards of the Federal law have the primary responsibility for enforcement. Also, States may have and enforce more stringent laws and regulations on food waste feeding.

Under the act, feeding of garbage to swine is prohibited unless it is treated to kill disease organisms at a facility holding a valid permit or license. Garbage is defined as all waste material derived from the meat of any animal, including fish and poultry, resulting from the handling and preparation of food. Waste from ordinary household operations fed directly to swine on the same premises is exempt.

Tuberculosis

Bovine tuberculosis is a chronic bacterial disease caused by *Mycobacterium bovis* that affects cattle and many other warmblooded animals, including man. Bovine TB can be transmitted from cattle to hogs, man, and other animals.

Bovine TB is an insidious disease, seldom becoming apparent until it has reached an advanced stage in cattle and swine. Some infected cattle seem to be in prime condition, showing no evidence of infection

until they are slaughtered. Yet, they may be so seriously infected that their carcasses are condemned.

As a result of a large-scale eradication program begun in 1917, the infection rate in cattle has been greatly reduced—from nearly 5 percent to less than 0.03 percent in 1981. Nevertheless, TB can still be found in all sections of the United States. In the decade from 1970 to 1980, the disease was confirmed in cattle herds in 35 States and Puerto Rico.

Today, with a very low rate of bovine TB, the most efficient way of finding the disease is through a nationwide surveillance program in slaughter plants. State or Federal meat inspectors check the glands and organs of cattle for signs of tuberculosis. If they find lesions indicative of TB, tissue samples are sent to NVSL for bacteriological examination. If the laboratory confirms that the lesions are suggestive of TB, an exhaustive attempt is made to trace the infected cattle back to their originating herd, which is then tuberculin tested. Reactors, if found, are sent to slaughter and checked for lesions.

If laboratory tests indicate *M. bovis* is present, every effort is made to liquidate all animals in the herd. Indemnities, as available, are paid to help compensate owners for their losses. If the herd cannot be liquidated, it is held under quarantine and tested repeatedly until all evidence of infection is eliminated.

Veterinary epidemiologists also attempt to determine the date the herd was probably infected. A concerted attempt to trace all cattle that moved into or out of the stricken herd then begins to try to find out where the disease came from and where it might have gone.

Swine tuberculosis is caused by the *M. avian* complex. It can result in rather heavy financial losses in some sections of the country because carcasses with lesions must be cooked or condemned at slaughter establishments. There is, at present, no national program for swine tuberculosis.

Veterinary Biologics

VS administers the Virus-Serum-Toxin Act of 1913, which requires that vaccines, serums, bacterins, antitoxins, and similar veterinary biological products be safe, pure, potent, and effective whenever they are shipped across State lines.

Veterinary biologics are regulated primarily through the issuance of Federal licenses and by a system of inspection, investigation, and testing. Licenses are issued for each producing establishment and for each biological product. Regulatory activities cover virtually every aspect of plant operations, production, and testing. Product labels are reviewed to make sure that proper instructions are included, that necessary precautions are stated, and that no misleading or false claims are advanced.

VS biologics specialists and compliance officers in the field inspect production plants and investigate violations of regulations and license provisions. This work is backed up by testing product samples at NVSL, which also develops standard testing procedures and assay methods.

When conditions warrant, VS can suspend marketing to protect against worthless, contaminated, dangerous, or harmful veterinary biologics products.

Veterinary Diagnostics

The diagnostic laboratory at NVSL provides support for VS disease control and eradication programs, such as brucellosis and tuberculosis. The laboratory also conducts most of tests required for import-export activities and provides general diagnostic assistance to the VS field force. NVSL maintains a readiness in case of an outbreak of exotic disease. Diagnostic reagents are produced when they are not available commercially. NVSL helps train VS field force and State laboratory personnel.

NVSL also develops and maintains diagnostic reference assistance and consultation services for VS field stations, State diagnostic laboratories, university research personnel, and foreign scientists.

International Operations of Veterinary Services



Disease Intelligence Service

VS has a representative stationed in Rome, Italy, who is responsible for monitoring the animal disease situation in Europe, the Middle East, and Africa. He also represents the agency in contacts with animal health officials in countries in those regions.

Foot-and-Mouth Disease Surveillance

Ever since an outbreak of foot-and-mouth disease (FMD) occurred in Mexico in 1946, the United States has recognized its vulnerability to disease introduction from its neighbors to the south. Once this FMD outbreak had been eradicated by a joint U.S.-Mexico effort, the two governments established a commission for the prevention of FMD. In the operation, the Mexican and U.S. governments both contribute personnel and financial resources to a program to investigate all reports of vesicular disease, to develop and enforce Mexican Ministry of Agriculture quarantine laws to prevent the spread of FMD or the introduction of other foreign animal diseases, and to carry out an extensive FMD eradication effort should an outbreak occur.

Since 1970, similar programs have been established in all Central American countries and Panama to assist their efforts to prevent the introduction of foreign animal diseases and to prepare for their eradication should they gain entry. To meet this commitment for the United States, VS veterinarians have been assigned in Central America and Panama.

In Panama, at its border with Colombia, the Darien Gap—an area containing swampland, dense jungle, and the Darien mountain range—has thus far prevented the highway systems of North and South America

from being connected. Currently, however, the Colombian government plans to complete the Pan American Highway through the Darien Gap, thus allowing greater movement of man and animals between the two continents. The United States has signed agreements with both Colombia and Panama to help prevent the northward spread of FMD—which is present throughout South America—during construction and after completion of the highway. A cattle-free zone has been established on the Panama side of the border and zones free of FMD are being set up on the Colombia side. Strict movement controls and surveillance systems are in effect, with a vaccine buffer zone set up in Colombia between the infected part of the country and the free zone. VS has personnel in both countries to assist in the Darien Gap program.

U.S.-Mexico Screwworm Eradication

Screwworms, the larvae or maggots of the screwworm fly (*Cochliomyia hominivorax*), attack all warmblooded animals, including humans, wildlife, and pets.

Unlike blowfly maggots, which feed only on dead or diseased tissue, screwworms feed on healthy flesh in open wounds. If left untreated, multiple screwworm infestations can kill a full-grown steer in 10 days.

Before eradication efforts began, screwworm infestations cost livestock producers about \$20 million a year in the Southeast and about \$100 million a year in the Southwest. Losses from screwworms in Puerto Rico often exceeded \$2 million a year.

The screwworm eradication program is built around mass rearing and aerial release of millions of sexually sterilized screwworm flies. Native fertile female flies that mate with sterile males lay eggs that do not hatch. Thus, screwworms literally breed themselves out of existence.

Screwworms were eradicated from the southeastern United States in 1958-59. In 1962, an eradication program began in the Southwest and by 1966 overwintering populations had been eradicated. Screwworms were eradicated from Puerto Rico and the U.S. and British Virgin Islands in 1975 after a 4-year campaign.

To eliminate yearly reinfestations in the Southwest from overwintering Mexican screwworm populations, the United States and Mexico agreed in 1972 to jointly finance (80-20 basis) and conduct a program to eradicate screwworms from that portion of Mexico north of the Isthmus of Tehuantepec. To protect against reinfestations, a protective barrier formed by continuous release of sexually sterile screwworm flies would be established across the 125-mile-wide Isthmus of Tehuantepec.

A production plant to rear, sterilize, and package up to 500 million sterile screwworm flies per week was built in 1976 in southern Mexico near Tuxtla Gutierrez, Chiapas. The former fly factory at Mission, Texas, was closed and placed on stand-by status in January 1981.

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